

Amendments to the Drawings:

Please replace drawing sheets 1-4 with corresponding replacement drawing sheets 1-4. Drawing sheets 1-4 include Figures 1, 2, 3A-3D, and 4, respectively. In the replacement sheets, Figure 1 is changed by deletion of item 135 and identification of the figure as prior art. The replacement sheets for Figures 2, 3A-3D, and 4 are provided without change to the content of the figures.

Related Attachments - Attachment A - Replacement Sheets 1-4

Please add new drawing sheet 5. Drawing sheet 5 includes new Figure 5 which is the same as originally-filed Figure 1. New drawing sheet 5, including new Figure 5, contains no new matter.

Related Attachment - Attachment B - New Sheet 5

REMARKS

This is in response to the USPTO Office Action of January 30, 2006. Reconsideration of the application is respectfully requested in view of the following remarks. Claims 1-14 and 16-19 remain in the application after this amendment is entered. Claims 21 and 22 are added to the application after this amendment is entered.

I. THE OFFICE ACTION

Figures 1 and 2 were objected to for not being designated as prior art.

Claims 1-14 and 16-20 stand rejected under 35 U.S.C. § 103(a) for obviousness over U.S. Pat. No. 5,767,956 to Yoshida in view of applicant admitted prior art (AAPA) (i.e., Figure 1).

II. SUMMARY OF INTERVIEWS

The applicant appreciates the many courtesies extended by Examiner Nguyen of the USPTO in granting and participating in telephone interviews on April 26 and June 9, 2006. The information exchanged and discussions that took place were quite helpful in narrowing the issues so that this response completely and adequately addresses the points raised in the January 30 Office Action. The applicants' Statements as to the Substance of these interviews accompany this paper and provide additional details regarding the interviews.

III. THE DRAWING OBJECTIONS

Amended Figure 1 is Designated as Prior Art.

The applicants respectfully submit that the overall combination depicted in the originally-filed version of Figure 1 was not prior art and was not admitted to be prior art in the originally-filed specification or otherwise. Accordingly, the originally-filed version of Figure 1 was not designated as prior art. Nevertheless, to clarify any confusion as to what is admitted by the applicants as prior art and to overcome the USPTO objection to Figure 1, the applicants have provided a replacement sheet for Figure 1 (see Attachment A) and a new sheet with a new Figure 5 (see Attachment B).

As for Figure 2, the applicants respectfully submit that, as originally-filed, Figure 2 does not represent prior art and was not admitted to be prior art in the originally-filed specification or otherwise. However, to clarify any confusion as to Figure 2, the applicants have amended the

paragraph in the “Brief Description of the Drawings” section to more clearly define its contents. Based on the foregoing, the applicants request that the USPTO objections to Figures 1 and 2 be withdrawn.

IV. THE ART REJECTIONS

Claims 1-14 and 16-19 Patentably Distinguish Over the Combination of Yoshida and Applicant Admitted Prior Art (AAPA).

Independent claims 1, 14, and 19 have been amended to more clearly identify and differentiate between a known signal, a degraded known signal, and a reference signal in conjunction with determining the quality of an optical link. The Amendments to the Specification section above includes the addition of a new paragraph from U.S. Provisional Patent Application Serial No. 60/430,207 which was incorporated in its entirety by reference, for example, at page 1, lines 11-16, of the originally-filed application. Accordingly, the new paragraph contains no new matter and provides additional support for the currently-pending claims.

The USPTO has rejected claims 1-14 and 16-20 for obviousness over the combination of Yoshida and AAPA. In support of rejection independent claims 1, 14, and 19, the USPTO states that Yoshida discloses transmitting and receiving the signal over an optical fiber (col. 3, lines 59-60), comparing the received signal to the known signal using optical correlation (col. 3, lines 55-67), and measuring a position of a failure point (col. 5, lines 45-50) and that AAPA discloses a known optical correlation method for determining the quality of an optical link (Figure 1). The applicants respectfully disagree with the USPTO’s position on each of these points.

First, at col. 3, lines 59-60, Yoshida discloses “a reflection light detector for converting a reflected optical pulse of a pseudo random signal to an electrical pulse signal.” Notably, Yoshida does not disclose or fairly suggest “transmitting the known signal over an optical link using a transmitting device associated with the optical link” or “receiving a degraded known signal using a receiving device associated with the optical link” as recited in independent claims 1, 14, and 19. Yoshida discloses “an optical power comparator for comparing an output optical power from the optical pulse generator and a reflected pulse power from an optical cable” (col. 3, lines 55-58). However, the Yoshida comparator receives a reflected optical signal that is

converted to an electric signal (col. 5, lines 51-56) rather than a optical signal that passes through an optical link.

Additionally, Yoshida does not disclose or fairly suggest “comparing the degraded known signal to a reference signal using optical correlation” as recited in claim 1 or “correlating the degraded known signal to a reference signal using optical correlation” as recited in claims 14 and 19. The USPTO cited col. 3, lines 55-67 of Yoshida to support rejection of this claim element. However, the term “correlation” is not found in this cited section of Yoshida. Moreover, Yoshida does not disclose or fairly suggest the use of optical correlation at all. Yoshida discloses that the “reflected optical pulse is converted to an electric signal by a reflected light detector 30 ... and is sent to a correlation detector 27” (col. 5, lines 54-56) and “in the correlation detector 27, the correlation is detected between the electric signal of the reflected light pulse and the random pulse signal from the variable delay circuit 26” (col. 6, lines 5-7). Notably, the correlation disclosed in Yoshida is electrical correlation (col. 6, lines 5-7) rather than optical correlation.

As stated by the USPTO, Yoshida discloses “measuring a position of a failure point” of an optical transmission line (col. 5, lines 45-50). Yoshida also discloses “an improved backward Brillouin scattering optical time domain reflectometry (OTDR) device is provided which is capable of ... measuring the position of the failure part with high resolution” (Abstract) and an “OTDR is generally used as a means for measuring distances of failure points or fractured points in a long distance optical device such as an optical transmission line” (col. 1, lines 18-21). However, as stated by the USPTO, “Yoshida does not explicitly disclose how to [detect] the quality of the fiber link as claimed.” (10/6/05 Office Action, page 3, third paragraph.)

Finally, AAPA (i.e., Figure 1) does not disclose or fairly suggest “determining a quality of signal of the optical link based on the comparison” as recited in claim 1 or “determining a quality of the optical link based on the correlating” as recited in claims 14 and 19. As stated in the “Brief Description of the Drawings” section of the originally-filed application, “Figure 1 is a schematic block diagram of a prior art correlator.” However, it is merely the basic hardware shown in the diagram that is prior art. As stated in the “Detailed Description” section of the originally-filed application, the “example correlator 100 ... may be used by the present invention” (page 4, lines 8-9). Notably, the methods recited in the claims define processes and algorithms that are not AAPA.

Moreover, neither Yoshida nor AAPA disclose or fairly suggest a reference signal that is “a suitably encoded representation of the known signal” as recited in claims 1, 14, and 19. This limitation finds support, for example, in the new paragraph that is added to the specification in the Amendments to the Specification section above. As mentioned, the new paragraph is from U.S. Provisional Patent Application Serial No. 60/430,207 which was incorporated in its entirety by reference in the originally-filed application. More specifically, the new paragraph states the following:

“The time-shifted and weighted signals are summed, and this combination of processes produces a correlation- the input signal is correlated with an arbitrary function that is implemented in the series of weights chosen. The resulting signal is a measure of how similar the incoming signal is to the reference signal encoded in the weights.”

With respect to the “reference signal,” it is understood that the “reference signal” is independent from the “known signal” in that the “known signal” exists on a transmitting device-side of the optical link and the “reference signal” exists on a receiving device-side of the optical link. Accordingly, the “reference signal” is not generated from the “known signal” using a beam splitter. Rather, the “reference signal” is “a suitably encoded representation of the known signal” that may be defined, for example, by $s(t)$ and s_k in equations 1 and 2 and of the originally-filed specification and the associated text describing these equations.


Based on the foregoing, claims 1, 14, and 19 are patentably distinct from the combination of Yoshida and AAPA on a number of separate grounds. Accordingly, the applicants respectfully submit that independent claims 1, 14, and 19 and claims dependent thereon (e.g., respectively, claims 2-13, claims 16-18, and new claims 21 and 22) are currently in condition for allowance.

CONCLUSION

Based on the foregoing remarks, the applicants believe that all of the pending claims (i.e., claims 1-14, 16-19, 21, and 22) in this application are now in a condition for allowance and an indication to that effect is earnestly solicited. Furthermore, if the USPTO believes that additional discussions or information might advance the prosecution of this case, the USPTO should feel free to contact the undersigned at the telephone number indicated below.

Respectfully submitted,

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Amendment C
Serial No. 10/726,771

ATTACHMENT A

Amendment C
Serial No. 10/726,771

ATTACHMENT B